Claims

1.   A predistorter arrangement for linearising a distorting element, the predistorter arrangement comprising predistorter means for processing an input signal which is required to be processed by the distorting element, to produce a predistorted input signal which is supplied to an input of the distorting element, pilot means for generating a pilot signal in the input signal, and error correction means for detecting the presence of specific orders of distortion derived from the pilot signal in the distorting element output signal to produce an error correction signal for controlling the processing of said input signal in the predistorter means.

2.   A predistorter arrangement as claimed in claim 1, wherein the distorting element is an amplifier.

3.   A predistorter arrangement as claimed in claim 2, further comprising means for removing the amplified pilot signal from the amplifier output signal prior to our following detection of the presence of distortion signals derived from the pilot signal in the amplifier output signal.

4.   A predistorter arrangement as claimed in any of claims 1 to 3, wherein the pilot means adds a pilot signal to the input signal.

5.   A predistorter arrangement as claimed in any one of claims 1 to 4, wherein the pilot signal is a multiple tone signal.

6.   A predistorter arrangement as claimed in claim 5, wherein the multiple tone pilot signal is a two-tone signal.

7.   A predistorter arrangement as claimed in any one of claims 1 to 4, wherein the pilot signal is derived from the input signal.

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8.   A predistorter arrangement as claimed in claim 7, wherein the pilot signal is a frequency translated version of the input signal.

9.   A predistorter arrangement as claimed in any one of claims 1 to 4, wherein the pilot signal is a single tone signal.

10.   A predistorter arrangement as claimed in any one of the preceding claims, wherein the error correction means detects the presence of distortion signals derived from cross-modulation of the input signal on the pilot signal.

11.   A predistorter arrangement as claimed in any one of claims 1 to 8, wherein the error correction means detects the presence of distortion signals derived from intermodulation of the pilot signal.

12.   A predistorter arrangement as claimed in any one of claims 5 to 7, wherein the frequency of the pilot signal is frequency hopped.

13.   A predistorter arrangement as claimed in any one of the preceding claims, wherein the predistorter means comprises an input signal path for receiving an input signal which is required to be processed by the distorting element, and a distortion path in which an input signal from the input signal path is processed to generate a distortion signal, which is combined with the input signal in the input signal path to produce the predistorted input signal.

14.   A predistorter arrangement as claimed in claim 13, wherein the correction means correlates the distorting element output signal with the distortion signal to produce an error correction signal.

15.   A predistorter arrangement as claimed in claim 13 or 14, wherein the distortion path includes means for adjusting the distortion signal in phase and amplitude in dependence on the error correction signal.

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16.   A predistorter arrangement as claimed in claim 15, wherein the adjustment means comprises a variable phase shifter and a variable attenuator.

17.   A predistorter arrangement as claimed in claim 15, wherein the adjustment means comprises an in-phase adjustment means and a quadrature phase adjustment means.

18.   A predistorter arrangement as claimed in any of the preceding claims comprising first and second predistorter means, the first predistorter means processing the input signal to produce a first predistorted input signal which is supplied as an input to the second predistorter means, and the second predistorter means processing the first predistorted input signal to produce the predistorted input signal supplied to the distorting element; first pilot means for generating a first pilot signal in the input signal, second pilot means for generating a second pilot signal in the first predistorted input signal; first error correction means for detecting the presence of distortion signals derived from the first pilot signal in the distorting element output signal to produce a first error correction signal for controlling the processing of said input signal in the first predistorter means, and second error correction means for detecting the presence of distortion signals derived from the second pilot signal in the distorting element output signal to produce a second error correction signal for controlling the processing of said first predistorted input signal in the second predistorter means.

19.   A predistorter arrangement as claimed in claim 18, in which the first and second predistorter means are adapted so that only one of them cancels higher order distortion.

20.   A predistorter arrangement as claimed in claim 18 or 19, in which the first and second pilot signals share one or more components in common which are derived from a common source.

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21.   A method for linearising a distorting element, including a predistorter step in which an input signal which is required to be processed by the distorting element is processed to produce a predistorted input signal which is supplied to an input of the distorting element, a pilot generation step in which a pilot signal is generated in the input signal, and an error correction step in which the presence of specific orders of distortion derived from the pilot signal in the distorting element output signal is detected to produce an error correction signal which controls the step of processing the input signal.

22.   A method as claimed in claim 21, including first and second predistorter steps, the first step being to process the input signal in a first predistorter to produce a first predistorted input signal which is supplied to the input of a second predistorter in which the second step is carried out by processing the first predistorted input signal to produce the input to the distorting element; first and second pilot generation steps in which first and second pilot signal, respectively, are generated in the first and second predistorters, respectively; and a first and second error correction steps in which the presence of distortion signals derived from the respective pilot signals in the distorting element output signal are detected to produce respective error correction signals which control the processing of signals in the respective first and second predistorter steps.

23.   A method as claimed in claim 22, in which one of the predistorters is inhibited from error correction while the other carries out correction to produce a steady state, and is then enabled to carry out correction.

24.   A control circuit for controlling a predistorter section of a predistorter amplifier, the circuit having a pilot generator means for coupling to an input of the predistorter section to add a pilot signal to signals input to the predistorter amplifier, and error correction means for coupling to an output of the amplifier to sample signals output from the amplifier and to detect the presence of specific orders of distortion derived from the added pilot signal, and for coupling to adjustment circuitry in the predistorter section to adjust the predistorter in dependence on the detected distortion signals.

25.   A predistorter arrangement substantially as described herein with particular reference to Figure 15.

26.   A predistorter arrangement substantially as described herein with particular reference to Figure 16.

27.   A predistorter arrangement substantially as described herein with particular reference to Figure 20.

28.   A predistorter arrangement substantially as described herein with particular reference to Figure 21.